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Turkey Production

F. E. Mussehl

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F. E. MUSSEHL
DEPARTMENT OF POULTRY HUSBANDRY

THE UNIVERSITY OF NEBRASKA
COLLEGE OF AGRICULTURE
EXPERIMENT STATION
LINCOLN
E. A. BURNETT, Director

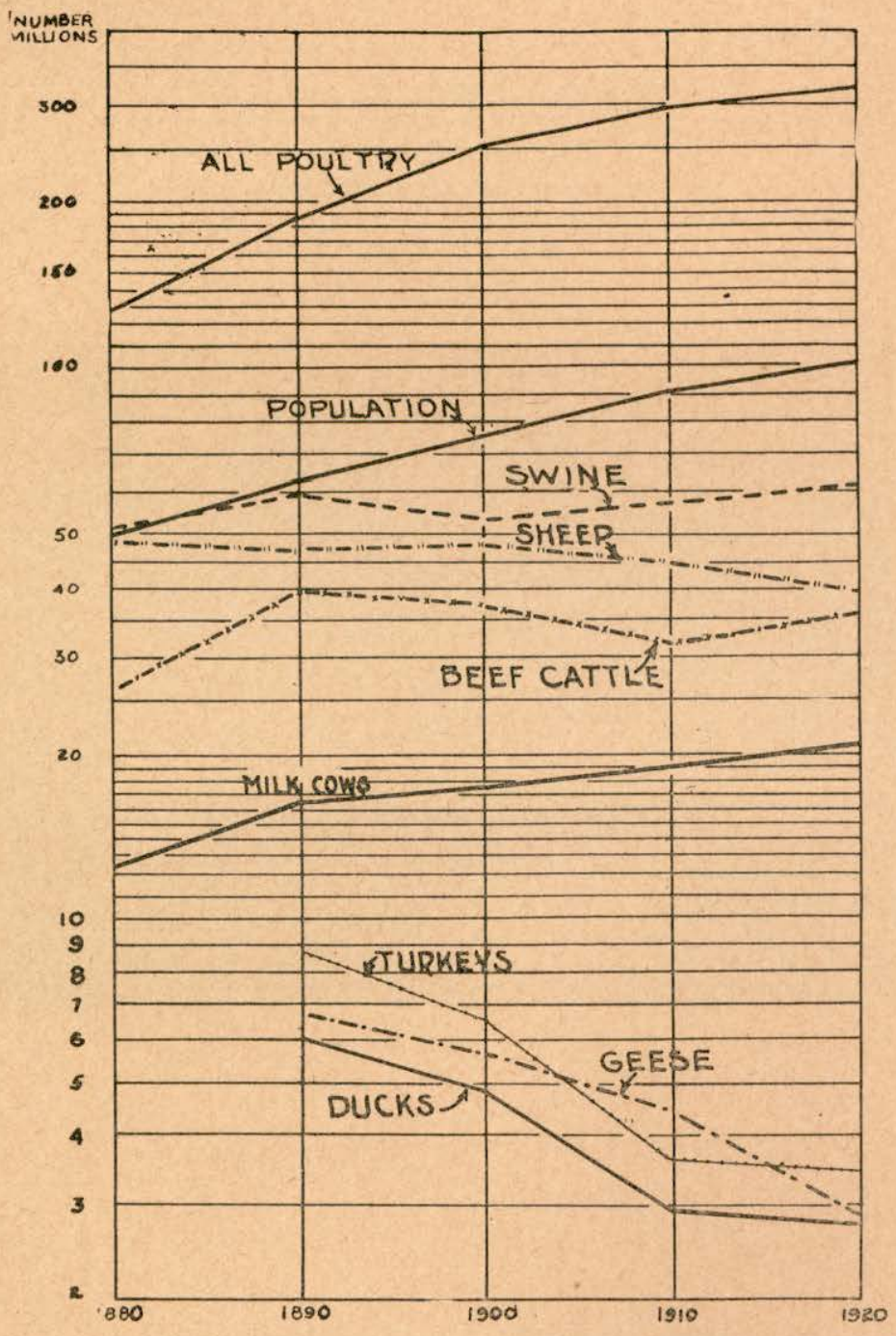

FIG. 1.—Turkey production has declined consistently since 1890 but this decline is not due to a lessened demand for turkey meat. This graph (from U. S. Dept. of Agr. Yearbook, 1924) also shows comparative growth of other lines of animal production and increase in human population.

Turkey Production

F. E. MUSSEHL[1]

Whatever problems turkey production presents, lack of demand for roast turkey is not at this time one of them. Turkeys rate so high in popular esteem that very rarely indeed do prices fall below that of dressed chickens and usually the best grades are 12 to 15 cents per pound higher during the holiday season. The world of commerce has become quite complex but the consuming public still has one clear way of speaking to producers. In the language of the dollar we are apparently being asked to raise more turkeys.

The first essential for success in any business — that there must be a demand for its products or for the service it renders — is therefore furnished us ready-made. Notwithstanding this wholesome demand for turkeys, the turkey crop has not increased during the past 30 years, but has actually declined in many states and in the United States as a whole as is shown in Figure 1. Early pioneers in eastern Nebraska tell us of the time when a flock of turkeys could be seen in almost every farmyard, but now such flocks are rare indeed. The all-inclusive explanation for this decline in turkey production has been "poor luck" in raising turkeys. It has seemed well worth while to study turkey raising obstacles and to try various methods of surmounting them.

The first step in this program was to make a survey of present production methods mainly to determine the problems which producers deem of greatest importance. A survey form, copy of which is included in this circular, was sent to 40 turkey raisers in various sections of the state. Thirty-one replies were received and we learned that very few records were being kept, but many interesting theories and experiences were submitted. The nearly universal judgment was that the disease problem, mainly blackhead, was the greatest limitation to turkey production, with coyotes, crows, and other pests important in the more sparsely settled sections.

[1] The cooperation of Mr. S. J. Marsden, Mr. J. Wray Taylor, and Mr. Chas. F. Jordan in carrying out parts of the observations herein reported is gratefully acknowledged.

Included also in the plan of studying turkey production was the raising of a flock of birds at the Agricultural College Poultry Farm each year for several years. In 1923 we obtained a few mature turkeys and a few eggs and attempted to raise them in the generally accepted orthodox way with natural hatching and brooding in a large cottonwood grove at the east end of the Agricultural College Farm. This attempt was not successful tho a few mature birds were raised. In 1924 and 1925 we tried artificial hatching and brooding with feed and environment under greater control and with much better success. With this experience as a basis we would offer three planks for a poultry production platform: namely, clean feed, clean water, and clean range. The turkey industry will probably grow in direct ratio to our interest in and inclination to provide these essentials.

TURKEY RAISING INFORMATION FORM[1]

How many birds in your breeding flock this year? Females..... Males.....

Do your breeding birds have free range?.....

About what time do your turkey hens start laying?.....

How many eggs do you expect to get from each turkey hen each season?.....

How many turkey eggs did you set in 1923?.....

What methods of hatching did you use? Turkey hens, chickens, or incubators? (Draw line through those *not* used.)

How many poults were hatched?..... Percentage of eggs set which hatched?.....

How many poults were raised to marketable age?.....

Which of the following problems are considered to be most serious by the turkey raisers of your community? (Please number in order of importance.)

Coyotes..... Crows..... Other pests.....

Blackhead..... Low prices.....

Do you produce turkey eggs or breeding stock for sale?.....

If so, how many eggs each season?..... Price per egg..... Stock.....

What breed of turkeys do you think is most practical for your community?.....

At what time of the year do you sell your market stock?.....

Do you market your turkeys alive or dressed?.....

Please outline your method of feeding and rearing young poults.....

.....

.....

Size of farm on which turkeys are being raised?.....

Type of soil?.....

Name of cooperator .....

Address .....

County .....

[1] Copy of form sent to 40 Nebraska turkey raisers.

HOW SHALL WE START?

We have a choice in starting our turkey raising operations with hatching eggs or mature stock. If good hatching eggs can be obtained from good vigorous stock this will generally be most economical. Turkey eggs sell from 20 cents to $1.00 each and the problem will be to get them early in the season so that the poults will develop into good breeding stock for next year's use. In Nebraska, turkeys do not generally start laying until about March 15, but if the breeders are well fed they will lay all summer and even into October. If special attention is paid to cleanliness and parasite control the poults hatched during the late summer and early fall months can

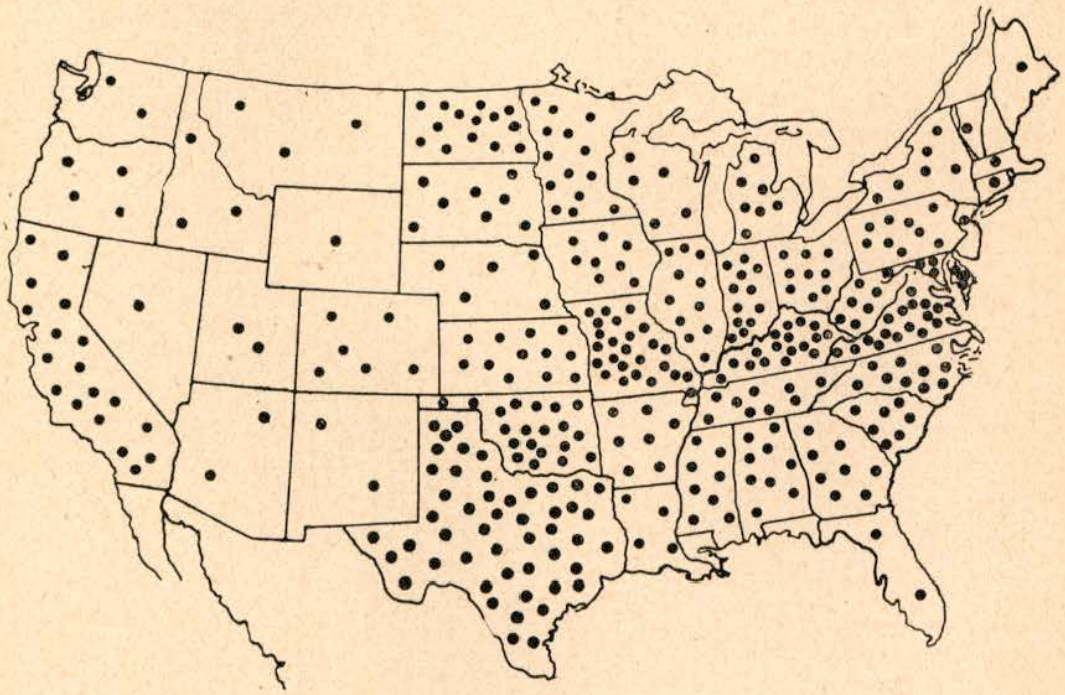

FIG. 2.— Map showing distribution of turkey production in the United States in 1920. Each dot represents 10,000 birds or major fraction thereof.

be raised to marketable age, but only early hatched poults should be used for breeders the following season.

If a start is made with matured breeding stock, selection should be based mainly on health and vigor. The names of breeders having stock and eggs for sale can usually best be obtained from farm and poultry papers. Long distance shipment of eggs, especially, is not desirable if a good supply can

be obtained nearby. For best results hatching eggs should not be over ten days old at time of setting.

INCUBATION OF TURKEY EGGS

Turkey eggs can be hatched with turkey hens, chicken hens, or with incubators. Artificial incubation has several advantages, one being that by avoiding contact between poults and older turkeys we are less likely to have trouble with blackhead. Furthermore, the time of a turkey hen is valuable from the egg production standpoint and we can lower our egg production costs by breaking up the turkey hens when they go broody. During the laying season of 1925 we obtained nearly 100 eggs per hen from a young turkey breeding flock at the Agricultural College. Many of these eggs were of course laid late in the season but some of the eggs laid in September were incubated and hatched poults which were sold the following February at a profit.

TABLE 1.— *Hatching record of turkey eggs,— first four hatches, 1925*

(Artificial incubation)

Date eggs set	No. eggs set	No. infertile	No. poults hatched	Percentage hatch of all eggs set
April 7.....	102	8	34	33.0
April 14.....	160	7	128	80.0
April 23.....	300	6	130	43.3
May 10.....	228	42	100	43.9
Total.....	790	63	392	Average 49.6

Turkey eggs can be hatched in any good incubator and we believe this method of hatching will grow in popularity. Incubation requirements are exactly the same as for hen eggs. Since turkey eggs are somewhat larger than hen eggs the suggestion is made that if the thermometer used is of the type that rests on the top of the hen eggs, the temperature should be regulated one-half degree lower than is recommended for the same machine when hen eggs are being incubated. The hatching period for turkey eggs is 28 days.

While the results of artificial hatching as reported in Table 1 leave much to be desired, nevertheless a survey of

the reports received from those who rely on natural methods shows no better averages. Apparently one of the problems which must be solved in lowering turkey production costs is that of obtaining higher fertility and hatching power.

FEEDING AND BROODING

Quick, economical growth and freedom from blackhead infections will be the main consideration in feeding the poults. Chicks and poults have much the same feed and temperature requirements. If any difference exists it is that the young poult, being even more of a high speed organism than the chick, responds more readily when well fed and

FIG. 3.— Sour skim milk given in crock feeders which can be cleaned easily.

brooded and fails more promptly when certain principles are violated. The feed and brooding requirements of young chicks are discussed in Nebraska Extension Circular 1401, and exactly the same principles apply to growing poults. One item in which we have been interested especially is the responsiveness of young poults to direct sunshine. We have several times experimentally produced severe cases of leg

weakness or " rickets " in poults by giving them rations complete in all respects except the anti-rachitic factor. When the rachitic poults have been exposed to direct unfiltered sunshine for a few hours on two successive days an immediate improvement was noted and complete recovery was obtained in about five days. Egg yolk and cod liver oil furnish the vitamin " D," which takes the place of direct sunshine, and these feeds therefore have great value during a cloudy, rainy period when direct sunshine is not available. Fortunately Nebraska turkey raisers are blessed with an abundance of this turkey raising essential and it should by all means be liberally used.

The following feeding program has proved successful for feeding poults:

First 48 hours.— No feed. Skim milk supplied in crocks when poults are put in the brooder or placed with the hen.

Second to ninth day.— One boiled infertile egg for 25 poults crumbled fine and fed on clean board or egg case top. Sprinkle a little dry mash on the crumbled egg. Feed three times daily. Give all the finely cut green alfalfa or similar green stuff that poults will eat after third day. Feed dry mash in box or trough feeder after third day. Dry mash mixture when plenty of skim milk is available — 3 parts cornmeal, 2 parts shorts, 1 part bran, 5 pounds raw bone meal, per 95 pounds other mash ingredients.

Tenth to 42nd day.— Continue hopper feeding of above mash mixture and skim milk. If milk is not available, add 15 per cent of good high grade meat scraps. Feed all the green alfalfa the poults will eat three times daily. Confine poults to sand covered yard if possible to lessen possibility of blackhead infection.

Seventh to the 20th week.— Continue hopper feeding of dry mash mixture, cutting down meat scraps to 10 per cent of total mixture. No meat scraps needed if skim milk is available. Clean range over an alfalfa field is quite ideal and will be effective in controlling grasshoppers. A clean water supply is very essential. Look upon every pond or puddle in the turkey range with great suspicion. Keeping the turkeys away from these will be better than ipecac, catechu, or other drugs given later.

Twentieth week to marketing time.— Fatten turkeys on corn with an occasional feed of mash moistened with milk. Provide free access to grit and oyster shell.

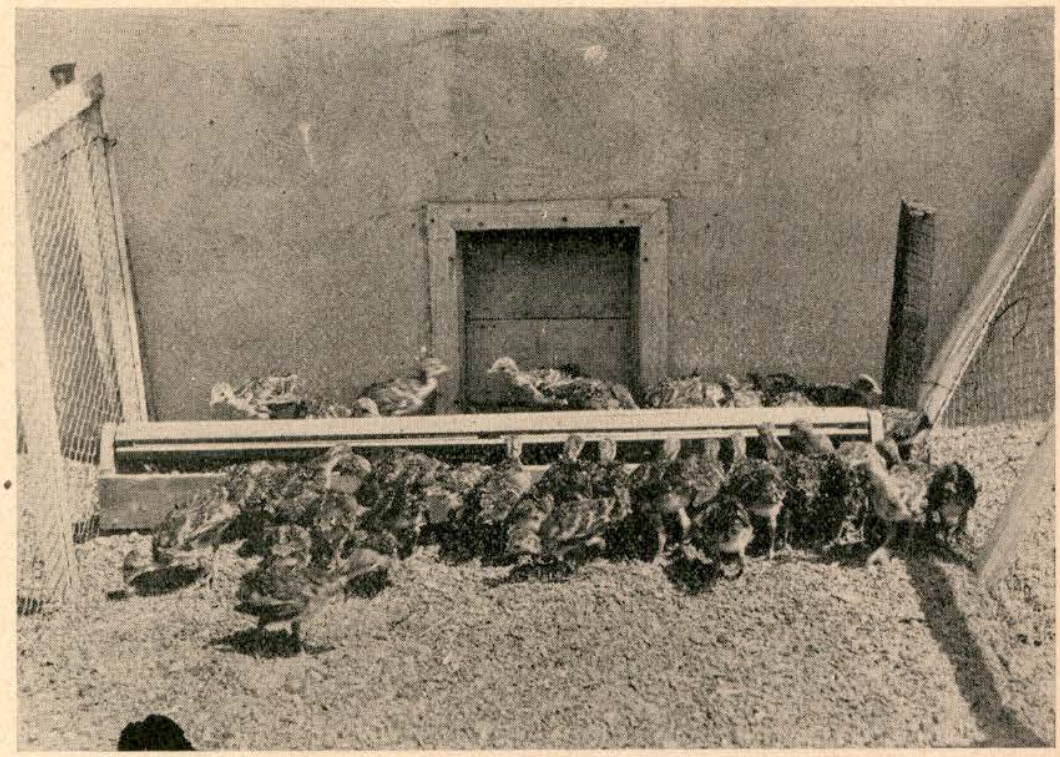

FIG. 4.—Young poults should have free access to a well balanced dry mash. This simple feeder with a lath reel will help to keep the feed clean.

TOTAL FEED REQUIREMENTS

A record of the feed consumption of one lot of poults raised at the Agricultural College Poultry Farm proved of considerable interest. This lot was hatched May 13 and weights were taken and feed records kept until October 28, just a few days before November 4, when most of them were sold. At that time the lot of 93 surviving birds averaged 12.3 pounds per bird, or a total of 1,143 pounds. They had consumed 3,712 pounds of grain and mash feeds and 2,762 pounds of milk up to that time. The range during the greater share of the growing period consisted of an alfalfa field and they consumed large amounts of this excellent feed. Nearly all of the feed was given in hoppers, so that the labor cost of feeding was not high.

TABLE 2.— *Turkey feed consumption record (not including green feed)*
Lot GX—98 poults

Period	Infertile hen eggs	Chick scratch	Dry mash	Skim milk	Green feed
		Pounds	*Pounds*	*Pounds*	
May 13–19 inclusive	25	.25	6.8	95	*ad lib.*— not weighed
May 20–26 inclusive	30	1.6	16.2	70	*ad lib.*— not weighed
May 27–June 2 inclusive	4	1.9	30.0	100	*ad lib.*— not weighed
June 3–9 inclusive		2.0	41.2	99	*ad lib.*— not weighed
June 10–July 8 inclusive		11.0	330.0	304	*ad lib.*— not weighed
July 9–Aug. 5 inclusive			560.0	376	*ad lib.*— not weighed
Aug. 6–Sept. 2 inclusive			706.0	328	*ad lib.*— not weighed
Sept. 3–30 inclusive			1040.0	1334	*ad lib.*— not weighed
Oct. 1–Oct. 28 inclusive		401.0*	564.0	56	*ad lib.*— not weighed
Total			3294.2	2762	

Total weight of 93 surviving turkeys on October 28 was 1143.2 pounds.

* Whole yellow corn.

The chick scratch referred to in Table 2 consisted of equal parts of cracked yellow corn and cracked wheat. The dry mash consisted of the following ingredients (parts by weight):

300 pounds yellow corn
200 pounds shorts
100 pounds bran
100 pounds meat and bone meal
7 pounds granulated salt

An observation of the growth rate of one lot of young poults raised at the Experiment Station also proved interesting. At hatching time the little fellows averaged only 1.7 ounces each, but four weeks later they averaged 12 ounces, an increase of 706 per cent. At eight weeks they weighed 34.4 ounces, which represents a gain of 287 per cent over the weight four weeks before. We must conclude from these observations that the young growing poult is a high speed animal and responds readily to good feed and care.

TABLE 3.— *Showing growth rate of turkeys — Lot GX*

Age in weeks	Average weight of 1 turkey calculated from the weights of				
	55 Females		43 Males		Mean (both sexes)
At hatch	May 13	1.7 ounces	May 13	1.8 ounces	1.7 ounces
1	May 20	3.1 ounces	May 20	3.4 ounces	3.2 ounces
2	May 27	5.1 ounces	May 27	5.8 ounces	5.4 ounces
3	June 3	7.9 ounces	June 3	9.3 ounces	8.6 ounces
4	June 10	11.0 ounces	June 10	13.0 ounces	12.0 ounces
5	June 17	15.1 ounces	June 17	16.0 ounces	15.5 ounces
6	June 24	19.2 ounces	June 24	24.0 ounces	21.6 ounces
7	July 1	25.6 ounces	July 1	32.0 ounces	28.8 ounces
8	July 8	30.4 ounces	July 8	38.4 ounces	34.4 ounces
10	July 22	48.0 ounces	July 22	59.2 ounces	53.6 ounces
12	Aug. 5	64.0 ounces	Aug. 5	81.6 ounces	72.8 ounces
14	Aug. 19	86.4 ounces	Ag. 19	110.4 ounces	98.4 ounces
16	Sept. 2	96.0 ounces	Sep. 2	137.6 ounces	116.8 ounces
20	Sept. 30	124.8 ounces	Sep. 30	192.0 ounces	158.4 ounces
24	Oct. 29	153.6 ounces	Oct. 29	248.0 ounces	200.8 ounces

ARTIFICIAL BROODING IS PRACTICAL

We have all observed the increasing use of artificial methods of brooding chicks. Economy of labor and better control of

the feed and of the environmental conditions which affect the growth and well-being of the chicks are the reasons for the growing use of artificial equipment, and for the same reasons we believe that artificial brooding of poults will grow in popularity. We would not advise brooding more than a hundred poults in each unit but this number can very well be cared for in an 8 x 12 or 10 x 12 portable colony brooder house. Either oil burning or coal burning brooder stoves can be used. These brooding devices should be regulated for several days before the poults are put in the brooder, so that a temperature of 100° F. is available at the outer edge of the hover. A strip of roofing paper or hardware cloth encircling the hover about 2 feet away from its outer edge will help to properly acquaint the poults with the environment of the brooder house during the first few days. Open the windows of the brooder house as soon as possible so the poults will obtain the benefits of direct sunshine.

A small yard covered with several inches of sand or gravel will be much more practical than free range for the first six weeks. After that the range of a good alfalfa field will be quite the ideal environment. Since chickens are known to be host to the blackhead organisms, the growing turkey flock should be kept entirely separate from the hens. Neither is it wise to permit poults to use range which has recently been used by hens, since the soil is likely to be infected with the blackhead parasite.

ROOSTING SHEDS

After the poults are well feathered out they can roost outside in cheap sheds or in the trees, provided the risk from predatory animals is not too great. The saving of one or two turkeys, however, will justify a cheap roosting shed which can be closed for protection against marauders.

MARKETING

The greatest demand for turkeys obtains at the time of the Thanksgiving and Christmas holidays. The turkey is traditionally the central figure about which Thanksgiving hospitality is organized and if the producer has early hatched, well finished birds, ready to market at least a week before that time, they may well be sold at that time. Unfinished stock that will not grade No. 1 quality should, however, not be sold at that time but should be held for the Christmas market.

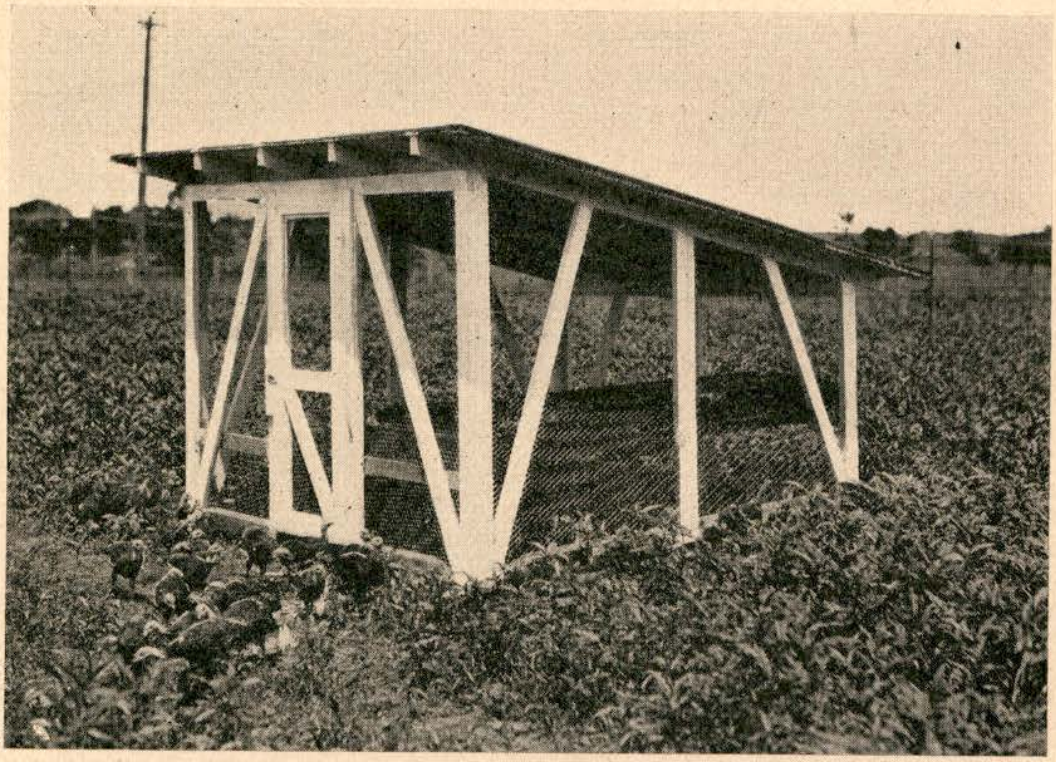

FIG. 5.—A cheap open shed will give protection against coyotes and similar pests.

No standard description of No. 1 quality stock is yet available, but in brief the qualities which make a dressed turkey attractive are as follows:

1. Straight keelbone and absence of other skeletal deformities.
2. Plump carcass, well fleshed in all sections.
3. No scabs or bruises on the carcass.
4. Well bled and dry picked.
5. Picked clean, all pinfeathers removed.

Whether to sell turkeys alive or dress them will depend on the local marketing service, distance from the final consuming market, and the availability of labor for doing the dressing on the farm. As a rule, turkey producers are not well equipped for dressing turkeys properly nor are they always skilled in the operation. Torn skins and poor bleeding lessen the attractiveness and the market value, and consequently one should not attempt the dressing operation without a demonstration by someone who is skilled in this work. Turkeys are considered dressed for market when they have been killed and the feathers removed. They are sold to the

consumer without removal of the entrails from the body. Investigational work by the U. S. Department of Agriculture shows that undrawn poultry keeps much better than does drawn poultry.

For dry picking, the turkeys are usually hung by their legs at a convenient height for killing. The jugular vein is cut by the single stroke of a sharp knife and the point of the knife is then pushed up thru the roof of the mouth into the brain. This last operation is known as " sticking " and when properly done paralyzes the bird and loosens the feathers so that they come out easily. Turkey feathers can be removed more easily than can chicken feathers, the proper bleeding and sticking being the most difficult part of the operation.

After the feathers have been removed, the body heat should be removed. At the time most turkeys are marketed in Nebraska, outside air temperatures at night will range from 30° to 45° F. Twenty-four hours' exposure to these temperatures will remove the animal heat, and this is very important. Care must be taken that the carcass does not freeze before the body heat is removed, but after the body heat is removed temperatures below freezing will do no harm. Clean barrels or boxes lined with clean paper are suitable for packing.

Dressed turkeys must of course sell at a higher price per pound than live turkeys to compensate for labor and shrinkage. Shrinkage will vary somewhat, depending on the condition of the birds, but will range from 12 to 14 per cent on well fattened stock. Ninety birds in one lot grown at the Agricultural College Poultry Farm totaled a live weight of 1,312 pounds, a dressed weight of 1,159 pounds, representing a dressing percentage of 88.3 per cent.

In some sections of Nebraska splendid marketing service has been rendered by cooperative organizations for marketing. Assembling the turkeys of one community at a central point, grading, and then offering the graded stock to the highest bidders has proved satisfactory for producers as well as dealers.

BREEDS AND BREEDING PROBLEMS

The difficulty of obtaining good hatching eggs at a reasonable price at the time they are wanted makes it imperative that nearly every turkey producer maintain his own turkey breeding flock. There is always a good demand for any surplus eggs which one may have, so that it will generally be

better to have a breeding flock somewhat larger than necessary for one's own needs.

The choice of a particular variety is not of so much importance as is the selection of good vigorous individuals within the variety. There are six standard varieties of turkeys, all of which are descended from the wild stocks which ranged over the eastern part of the United States from Maine to Florida. The standard shape and color descriptions of these are given in the " Standard of Perfection " which is published by the American Poultry Association. The standard weights of the respective varieties are given in the following table:

FIG. 6.— The turkey breeding flock. Keep turkeys and chickens separate for best results.

TABLE 4

	Adult cock (2 years old or over)	Yearling cock (1 year old and less than 2)	Cockerel (less than 1 year old)	Hen (1 year old or over)	Pullet (less than 1 year old)
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bronze	36	33	25	20	16
Bourbon Red..	30	25	20	18	14
Narragansett	30	25	20	18	14
White Holland	28	24	20	18	14
Black	27	22	18	18	12
Slate	27	22	18	18	12

For our experimental work at the Agricultural College Poultry Farm we have used the Bronze variety. This variety is probably the most popular and, as the standard weights indicate, is the largest of the standard varieties. Since turkeys are sold by weight, their large size is an asset. The first essentials to be looked for in selecting breeders are constitutional vigor and freedom from all physical defects.

One of the factors affecting the cost of turkey production is the number of eggs laid by each female bird. We have so far not trapnested any of our turkey hens, but a study of the flock from the physical standpoint indicates as great variations in egg laying ability among turkey hens as among chicken hens. Selection for productive capacity because of the value of the eggs for hatching purposes is likely just as practical. In this respect our observation at this time has been that pullets lay much better than yearling hens. The apparent vigor of the poults hatched from pullets has been at least equal to that from the yearling hens and we do not believe there is any special disadvantage when the early hatched, rapid maturing birds of the previous year's hatch are used for breeding stock.

In 1925 our breeding flock of 35 pullets averaged nearly a hundred eggs per bird thru the entire season. The egg production per month until October 1 was as follows: March, 21; April, 735; May, 507; June, 620; July, 634; August, 544; September, 263. Not all these eggs were used for hatching because many were laid after the practical hatching date had

passed; but the interesting point is that turkey females will lay more than the allotted two clutches, or 30 eggs, if encouraged to do so.

Another interesting item about this breeding flock was that a flock mating of 35 pullets with 4 toms proved very successful. The males used in the mating were raised together and were placed with the flock at the same time. Sometimes the males in such flock matings fight a little, but this method of handling saves the labor which would be necessary if the males were alternated regularly. Three males for 35 hens or pullets are sufficient to insure good fertility. The common belief that one mating fertilizes all the eggs laid by one hen in one season is probably based on superstition and should not be relied upon.

DISEASES AND PARASITES

It is not the plan in this circular to discuss turkey diseases and parasites from a detailed technical standpoint but only to mention briefly those which especially affect the management and production problems. For a more detailed discussion of blackhead, roup, and other troubles which affect turkeys we would refer our readers to Nebraska Experiment Station Bulletin 195.

As was stated at the beginning of this circular, the usual reason given for the decline of turkey raising is the blackhead disease. This disease is caused by a small protozoan parasite which enters the digestive system thru contaminated feed and water. Many different chemicals and drugs have been recommended, but to date no treatment has proved positively helpful in controlling this trouble. There is evidence, however, that a clean feed supply, a clean water supply, and clean yards will make turkey raising quite safe, and our turkey program should be built on these essentials rather than on ipecac, catechu, or epsom salts. A few dollars spent in providing covered feed troughs and water pans will be more wisely invested than if spent for so-called blackhead "cures." We show herewith several types of feeders and watering devices, not that these are perfect but that they bring us a little nearer the goal of practical sanitation.

Just how to arrive at the clean ground ideal is probably the most difficult item in our turkey program. There is considerable evidence that the blackhead-producing parasites can live for long periods in the soil and just what policies aid in purification have not yet been definitely established. Cultivation

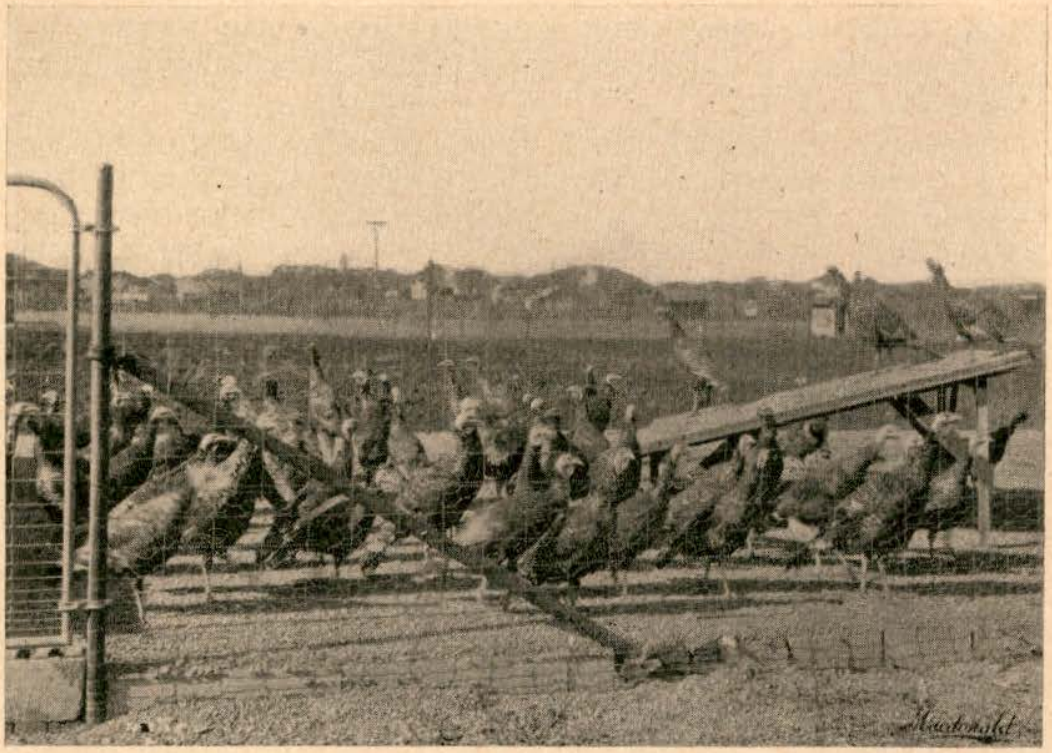

FIG. 7.— Clean ground is more essential than a large range. Seventy turkeys were raised in a gravel covered yard 24 x 50 feet with a mortality of one poult during the season.

is probably helpful, especially for the heavier soils. Soil sanitation is not so difficult in those sections where the soils are light and permeable and where each rain quite definitely washes the body wastes deep down into the soil. For this reason those sections of Nebraska having light soils are splendidly adapted to turkey production.

Free range over an entire township is not in itself a solution of the blackhead problem, as is attested by many turkey raisers who have glorious distances for their birds to ramble over. If all the range were equally used, the infectious material would be diluted over a great area and the risk would be reduced, but practically this is never the case and the disease is picked up when the turkeys range over the soil which has been contaminated by previous contacts. The answer to this problem may vary from place to place, from farm to farm, and individual producers can best work out the most practical methods of obtaining the 3 C's of turkey success. However simple the suggestions may be, we want to stress them once again — clean feeding methods, a clean water supply, and a clean range.

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